Evaluating Public Awareness of New Currency Design Features

Lisa A. DiNunzio*[a], Sara E. Church[b]
[a]Bureau of Engraving & Printing, Washington, D.C. 20228; [b]Bank of Canada, Ottawa ON K1A 0G9

ABSTRACT

One of the goals of the 1996 series design was to integrate highly recognizable features that enable the general public to more easily distinguish counterfeit from genuine notes, thereby reducing the chance of counterfeit notes being passed. The purpose of this study is to evaluate how knowledgeable the public is concerning the new currency, to identify the channels through which the public learns about new currency design, and to assess the usefulness of the new currency's authentication features. Also, the study will serve as a baseline measurement for future design studies and in comparative analysis with other countries. The results of the qualitative research will be described in the following sections of this paper. The quantitative research is scheduled to begin in February 2002, at the same time as the Netherlands' opinion poll of the Euro and NLG-notes in an effort to compare results.

Keywords: counterfeit deterrence, focus group, security feature usefulness, survey, currency awareness

1. BACKGROUND

Since 1996, the Bureau of Engraving and Printing (BEP) has been producing Series 1996 Federal Reserve Notes. The new design series notes included a number of features intended for use by the public: enlarged, off-center portraits, registered portrait watermarks, security threads, microprinting, color-shifting ink, and fine-line printing patterns. To evaluate the public's knowledge of the new currency design and to determine the usefulness of the new currency features for authentication, the BEP issued an open solicitation for proposals for a market research study. The results of the study will assist in the selection of counterfeit deterrence features in the next generation of currency, that may be issued as early as the year 2003.

The Bureau solicitation specified that contractors would be required to develop a two-phase market research study that would evaluate public knowledge of the Series 1996 currency design and determine the usefulness of the new currency features to the public for note authentication. The study design was to be performed with a .05 confidence level that target audience responses would be representative of the population. The contract was awarded to Deloitte & Touche in partnership with Shugoll Research.

Working closely with Treasury and Federal Reserve technical experts, the contractor's project team developed a project plan that would target six specific audiences to include in the study: consumers, bank tellers, cashiers, gaming industry employees, law enforcement officials and teachers. The project plan called for focus groups to be conducted by the end of 2001. The results from the focus groups will be used to design the quantitative national survey, which is will be used to confirm or refute findings and hypotheses generated in the qualitative phase. The survey will be performed in February 2002, timed to correspond with the Netherlands' opinion poll of the Euro and NLG-notes to facilitate comparative analysis.

In this report, only findings from the qualitative phase of research are presented. The purpose of the quantitative phase is to confirm or refute findings and hypotheses generated in the qualitative phase.

2. METHODOLOGY

In the project plan proposed by the Deloitte & Touche/Shugoll Research team, the qualitative research phase is conducted as stage one followed by a quantitative research phase as stage two. The qualitative research phase is designed

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* Correspondence - E-mails: lisa.dinunzio@bep.treas.gov ; schurch@bank-banque-canada.ca

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to identify the most relevant population segments for interviewing in the second phase and to identify specific data elements that will be measured in the quantitative phase.

The purposes of the qualitative research phase are to:

- Determine awareness/perceptions of new currency design features
- Evaluate knowledge of/attitudes toward counterfeit deterrent features
- Identify the "ideal" set of currency security features
- Determine the optimal methods for communicating currency feature information

The approach designed by the Deloitte and Touche/Shugoll Research team for the qualitative research was to use focus groups comprising members of the general public, educators, law enforcement officials and those in cash handling occupations. The research team proposed this technique because it would facilitate idea generation. In a focus group setting, group dynamics and the interaction between respondents that typically occur in a group environment can stimulate new and more thoughtful insights than if only one respondent is interviewed at a time. The group setting would support in-depth discussions of issues related to the new design, the old design and the counterfeit deterrent features of the currency. In addition, the focus groups could be used to identify obstacles to examining currency for authentication features as well as to determine messages that may motivate segments of the population to examine currency more often.

Another advantage of focus groups is that they allow examples and descriptions of the new currency and its security features to be shown to respondents in an open-ended environment. In this environment, respondents could view and discuss the old and new currency designs, specific advertising/educational materials, and current and proposed communication messages to provide in-depth feedback for subsequent evaluation.

As mentioned above, twelve focus group sessions were conducted, two with each of the target audience segments identified by the interagency experts: general public consumers; bank tellers, gambling casino dealers and cashiers; retail workers/cashiers (employed in convenience stores/gas stations/amusement parks/truck stops, etc.); teachers; and law enforcement officials (a mix of local, state and Federal officers). The focus groups were conducted in six cities that represent major geographic areas of the U.S.: Miami, Florida; Washington, D.C.; Chicago, Illinois; Denver, Colorado; Las Vegas, Nevada; and Los Angeles, California. Both gambling casinos segment were conducted in Las Vegas, one group with dealers and one group with casino tellers/cashiers. The other segments were split up among the other five markets. Table 1. Focus group schedule matrix, illustrates the location, date and time of each target audience segment.

All respondents were screened to ensure that neither they nor anyone living in their household had ever worked in a sensitive industry, such as market research, advertising or public relations. With the exception of bank tellers, respondents also were screened to ensure that neither they nor anyone living in their household had ever worked as a teller in a bank, credit union or other type of financial institution.

3.0 FINDINGS

The findings of the qualitative phase of this two-phase study reflect the four goals of the study: determine awareness and perception of new currency design features; evaluate knowledge of and attitudes toward anti-counterfeiting measures; identify the ideal set of currency security features; and determine optimal method for communicating currency design features information.

3.1 Determine awareness/perceptions of new currency design features

Some focus group participants described the look of the 1996 redesigned currency as patriotic, having historical significance and having a consistent pattern that makes it familiar and easily recognized. However, some respondents also described the look of the Series 1996 currency as "phony" or like "play money" because of the exaggerated size of individual features, such as the larger portrait and larger numbers indicating denomination. Figure 1. diagrams the appearance and location of the design features for the 1996 series $20 note.

Many respondents referred to the overall look of the newly designed currency as cluttered or distracting. Several respondents specifically commented about an inability to quickly identify a note's denomination from the front because the numeral identifying the note's denomination is "buried" within the top scroll border.

Some respondents said that U.S. currency is "bland" because all of the notes are uniform in size, design and color. For instance, many respondents indicated that the uniformity across denominations of U.S. currency is a problem. Several consumers mentioned that when paying for something with cash, they have used a note that was a different denomination from what they intended. For example, they paid for something with a $10 note thinking it was a $20 note. Other respondents contended that U.S. currency is boring compared to foreign currency, saying that foreign currency is more visually appealing because it is so colorful.

Of the changes that have been incorporated into the U.S. 1996 currency design series, most members of the target audiences were familiar with the watermark and security thread. Furthermore, quite a few respondents indicate that they personally have used either the watermark or the thread to authenticate currency because they believe that these two features would be "virtually impossible" for a counterfeiter to replicate. Figure 2. compares genuine watermarks to counterfeit $100 watermarks and Figure 3. compares genuine security threads to counterfeit $100 threads.

Generally, respondents recognize that the large, off-center portrait is a design feature that has been added since 1996. However, most of these respondents would not rely on this feature to authenticate currency. They believe that the larger, off-set portrait is unreliable as a security feature because it would be relatively easy for a counterfeiter to simulate.

While the general public is less familiar with other design changes, a number of professional cash handlers appear to be familiar with the color-shifting ink, microprinting and fine-line printing patterns. Some cashiers, including casino cashiers, mention that they can use a special pen to authenticate Series 1996 notes because of the new currency's paper stock. These respondents say there is a design element within the paper that turns color when this special pen scans the notes. However, the "pen test" is not infallible.[1]

As with some consumers, many cashiers and a majority of casino employees say they turn the note over to the back and look at the large number in the lower right-hand corner (low vision feature) to verify the note's denomination. They say it is much easier to see the note's denomination on the back than on the front because of the large, bold numeral in the back right-hand corner. The larger number and greater contrast draw the eye quickly to that numeral for rapid recognition. This large, bold numeral was added to the Series 1996 design to assist those with low vision in denominating their currency. The design of the numeral was based on the results of a study *Currency Features for Visually Impaired People*[1] conducted by the National Materials Advisory Board under contract to the BEP in 1995.

3.2 Evaluate knowledge of/attitudes toward anti-counterfeiting measures

Overall, focus group respondents reported little *personal* interest in being able to identify genuine currency. They view counterfeiting as an issue that affects governments and businesses, but not ordinary citizens. Respondents assume that the cash they handle is genuine because they "trust the government and their bank" to ensure that counterfeit notes are not circulated.

Additionally, most respondents indicated that if they received a suspected counterfeit note, they would "pass it along" as quickly as possible, because they could not afford to "lose the money." They attribute their attitude to the banks' and Federal government's policy of not reimbursing individuals when they surrender a counterfeit note. Participants seem to subscribe to the "ignorance is bliss" notion that if they are unaware of the authentication features they are therefore less culpable if caught passing a counterfeit note.

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[1] The pen tests for starch content; U.S. currency paper does not contain starch and therefore when the pen is applied to genuine currency it leaves only a light yellow mark or none at all. However, if the pen is applied to paper containing starch, as most commercially available paper does, it leaves a dark brownish mark. The pen is not recommended for authenticating currency because it is not always accurate and results can be manipulated using various chemicals.

Conversely, individuals who handle cash on a daily basis in a *professional capacity* (e.g., cashiers and bank tellers) say they do think about the authenticity of the cash they are handling on the job. They say this is because they are held responsible when their place of business is adversely affected by receiving counterfeit notes. However, these individuals admit that they are much more apt to examine a larger note (e.g., $50 or $100) than a smaller note (e.g., $10, $20) because they assume that counterfeiters tend to only produce larger notes.[2]

Interestingly, not all professional cash handlers, nor all law enforcement officials, agree that authenticating currency is within their area of responsibility. Casino dealers in particular believe authenticating currency is the casino cashiers' responsibility because dealers are expected to keep the game moving and don't want to offend customers by examining notes to check for counterfeits. Additionally, some law enforcement officials hold the opinion that they can't be expected to be an "expert" in all aspects of law enforcement, and that counterfeit detection is not part of their responsibility.

Focus group participants were asked to recall when and how they first learned about the newly redesigned currency. Many respondents were unaware of the new design until they received a series 1996 note during a cash transaction. A few individuals mentioned that they had seen or heard something about the newly designed currency on a news program, in the local newspaper, or at their local bank.

Some bank tellers and cashiers indicated that they received information from their employer about the new design features, but the information and the method of dissemination varied widely. Several bank tellers and cashiers, including casino cashiers, said that their employer held formal training sessions. For this training, employers distributed educational information about the redesigned currency, reviewed it with employees and conducted follow-up testing to ensure that employees were aware of the new design features. Fewer respondents recall that a "representative of the Federal government" was present during the educational sessions to review materials and answer questions.

No matter how individuals learned about the new currency design, most respondents believed the purpose of the redesign was to protect against counterfeiting. Respondents said they had this impression based on information they had seen or heard in the news, or because of certain security features.

3.3 Identify the ideal set of currency security features

When asked to complete this statement, "I could recognize genuine currency in a second by . . ." respondents offered a number of ways in which they think they could quickly recognize genuine currency. Quite a few respondents, regardless of their professional background, said they would look for the watermark feature because they believe it is "almost foolproof" in terms of a counterfeiter not being able to replicate it. Several cashiers and bank tellers said they could recognize genuine currency by its feel. According to cashiers, genuine currency, including the newly designed currency, has a certain feel because of the paper stock that counterfeit notes don't have.

Interestingly, some professional cash handlers say they could not recognize genuine currency "in a second" because it takes some time to examine a note to determine its authenticity. Specifically, these respondents say they would want to not only look for the watermark, but other security features as well, such as the security thread. Therefore, they feel uncomfortable in stating that they could recognize genuine currency within such a short time.

During the course of the interviews, respondents were given a handout that described each of the six currency security features that have been added in the Series 1996 designs. After reading the descriptions, respondents were asked to rank order the features in terms of how useful each is in helping them to identify genuine currency. The features are as follows:

- Enlarged, off-center portrait
- Watermark
- Security Thread
- Microprinting

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[2] In fact, according to the U.S. Secret Service the $20 note is the most domestically counterfeited denomination

- Color-shifting ink
- Fine-line printing patterns

Table 2. Security feature tallies, reflects how each group of respondents ranked the security features in terms of the two most useful features and the two least useful features for authenticating currency. The majority of respondents identified the watermark as the most useful feature, with the security thread ranking as the second most useful feature.

Respondent opinions about the usefulness of the larger, off-center portrait are mixed. Because of its larger size, some respondents say it is easier to identify the portrait subject and confirm that it is the right figure for the specific denomination (e.g., President Jackson on the $20 notes). However, several respondents say they have never memorized which portrait is on which note; therefore, the increased size of the portrait is meaningless. Also, quite a few respondents say they believe that the large portrait feature is something that a "good" counterfeiter could easily duplicate, making the feature less useful than the watermark or security thread.

Interestingly, several respondents, particularly respondents who do not handle cash as part of their job responsibilities, acknowledged that they were not aware of the color-shifting ink feature prior to participating in the focus group. Even after reading the feature description quite a few respondents said they did not understand the overall usefulness of the feature, so they ranked it relatively low. However, as respondents started looking at actual currency and personally seeing the color-shifting-ink feature, their opinions about the overall usefulness changed. Specifically, they decided that the feature is more useful than originally thought because it is very easy to use and rather complicated to replicate.

In agreement with the University of Texas study[2] commissioned by the BEP to determine quantitative effectiveness of the new security features, the fine-line printing patterns and microprinting features were deemed to be much less useful in identifying genuine currency because both these features require too much time and effort to examine. Therefore, although a feature may be difficult to replicate and may be helpful in establishing authenticity of the note in question, relying on the feature as a tool is too time consuming.

Respondents in each group were asked to brainstorm other design elements that might be used to identify genuine currency. A number of respondents were unable to think of any such specific design elements. However, quite a few suggested changing the overall look of U.S. currency by using different colors for different denominations. Respondents said that making U.S. currency more colorful would make it more visually appealing and easier to recognize the various denominations. Also, according to respondents, a by-product of this new feature might be counterfeit deterrence because they perceive that replicating color, particularly when each denomination has its own unique color, would be almost impossible to do.

3.4 Determine optimal method for communicating currency design features information

In order to encourage more people to want to be able to authenticate currency, people must know what the personal benefits are. According to respondents, both general consumers as well as cash handling professionals might become more receptive to familiarizing themselves with currency design features if they received information about the purpose for changing the design, how the new design elements differ from the current ones, the impact of counterfeiting on the economy and how this impact negatively affects the everyday consumer.

According to focus group participants, channels for communicating currency redesign information to the general public should include:

- Print advertising in mainstream, specialty and news-oriented magazines
- Print advertising in local newspapers
- Articles in local and national newspapers
- Direct mail
- Placing merchandising and collateral materials in public areas (e.g. grocery store, public library, bank branch offices, etc.)
- Coverage on local and national television news programs

- Coverage on magazine-format television programs
- Bubble and pop-up advertising on the Internet that link to the most appropriate Federal agency website

Members of target professional segments recommended mandatory training sessions to inform them about future design changes to U.S. currency. Additionally, respondents felt that the presence of a Federal agent at these training sessions would add credibility to the training, emphasize the importance of being familiar with genuine currency design features, and underscore the professional benefits associated with having this knowledge.

4. CONCLUSION

A number of interesting results have been obtained from the qualitative phase of the study, some of which support previous results or assumptions, some of which are at variance with earlier findings and others of which simply provide valuable insight into how the public perceives and uses its currency.

4.1 Public confidence and knowledge

It is reassuring that results from the qualitative research indicate that generally, the public is confident that they are handling authentic currency, because they trust their bank and government to identify, destroy and prevent circulation of counterfeit notes. Respondents view counterfeiting as a global issue, but they are not particularly concerned with receiving a counterfeit personally, because they would probably pass it off to an "unsuspecting" person so as not to take the loss themselves. Among the factors contributing to this lack of interest are the misperception that most counterfeit notes are larger denominations (e.g., \$50 or \$100 notes), which respondents say they typically do not handle, and the growing trend of using credit and debit cards more often than cash for retail transactions. However, respondents who handle cash at their place of work are concerned about being held responsible for counterfeits at a professional level.

An unexpected finding was that at least some cashiers, and a majority of casino cashiers, use the large, bold numeral on the back of the note to identify the denomination. This result is perhaps a good example of the law of unintended consequences and the principle that by helping a few, many are helped. Originally intended as an aid to those with low vision capabilities, the large numeral on the back of the note is apparently helpful to a larger audience than intended. That it draws people to use the back may provide a bonus. Perhaps the argument can now be made that security on the back of the notes is a worthwhile investment.

Of the various changes that were made to U.S. currency design in the 1996 designs, most members of the target audiences are familiar with the watermark and security thread, which they perceive to be almost impervious to counterfeiting. This finding is somewhat at variance with the results of the Texas study. The Texas study found that the effectiveness of a feature depended on the denomination being examined, watermarks were found to be less effective for \$20s than for \$50s and \$100s.

On the other hand, the study at the University of Texas found that the larger portrait, perceived according to comments in the focus groups to be easier to duplicate, was actually found to be one of the more helpful features in distinguishing genuine \$100 notes from counterfeits. In contrast to the focus group assumptions, the purpose of the larger portrait is not specifically intended to aid in denominating, but to distinguish genuine from counterfeit by calling attention to the greater detail possible in the larger portrait. The underlying theory is that since faces are the most recognizable image to humans, variances from the genuine will be more easily recognized in the larger, more detailed portrait than in the smaller ones, which have fewer lines and less detail.

A further misconception that came to light during the focus group study is that color in banknotes is impervious to counterfeiting. This perception may contribute to the apparently ready acceptance of poor-quality ink-jet counterfeits. In contrast, with modern color imaging technologies such as scanners, imaging processing software applications and desktop color printers readily available to the public, color is actually relatively easy to replicate.

Despite the accuracy of the respondents' opinions on these issues, the perceived resistance of a feature to counterfeiting may gauge its usefulness by the public and is worth further research. The public's use of features that are perceived to be more secure than they are, may actually either boost public confidence in the currency, or give a false sense of security.

4.2 Public education

Results of the qualitative phase of the study support prior assumptions about the importance of education in counterfeit deterrence and note authentication.

The public apathy regarding note authentication was apparent in the focus groups. Perhaps most surprising was the apathy expressed by law enforcement agents. If the public is regarded as the first-line defense against counterfeiting, local enforcement agents surely serve as the second line. If their rationalization for shirking this responsibility is lack of knowledge, this is a problem that can be addressed through education.

The comments in the focus groups that making the currency more visually appealing would enhance security supports findings by the Netherlands Central Bank[3] in their public opinion polls. In their result, they found that the more people liked their notes and found them attractive, the more likely they were to know what the design elements and security features were.[4] This suggests that education about the security features can be aided by designing notes that appeal to the public.

While there is some reluctance to accept responsibility for being able to identify genuine currency, many professionals are amenable to receiving information about currency design changes. In fact a number of respondents indicate that if more people are to want to be able to authenticate currency, they must know what the personal benefits are. According to respondents, both general consumers as well as target professionals might become more receptive to familiarizing themselves with currency design feature if they receive the following information:

- Main purpose/intent of changing design elements
- How the design elements differ from current ones and why
- Significance of counterfeiting and its impact on the national economy, as well as local economies
- Trickle down effect of counterfeiting/how it negatively impacts "everyday consumers"

4.3 Phase 2 quantitative study

All of these findings will be explored in the quantitative phase of this study. The survey instrument will be designed to measure actual awareness levels of the six security features and to confirm or refute the findings from the qualitative study, which has identified some communications and education strategy implications.

The surveys, to be conducted in February 2002, will consist of 1,400 telephone interviews approximately fifteen minutes in length. The interviews will be conducted with 200 members of each of the six target audiences, with the exception of the general public, which will have 400 interviews. The results of the quantitative survey will be used to confirm or refute findings and hypotheses generated in the qualitative phase. The Government will use results from both phases of research to make future currency designs more useful to the public and to improve methods of communicating information about genuine currency to the public. Since the introduction of the Series 1996 currency designs, the U.S. has adopted a policy of regularly changing its currency in response to technology changes that aid the counterfeiter. As the designs are changed, the necessity of assessing the impact of the changes becomes crucial to making those changes useful. The undertaking of this first public survey, which has already provided valuable information, is an essential step in this process.

Table 1. Focus Group Schedule Matrix

Public Survey Focus Group Schedule			
Focus Group	**Date 2001**	**Location**	**Time**
Cashiers	1-Oct	Las Vegas, NV	4:00 PM
Dealers			6:00 PM
Teachers	2-Oct	Los Angeles, CA	4:00 PM
Bank Tellers			6:00 PM
Teachers	9-Oct	Bethesda, MD	5:00 PM
Law Enforcement			7:00 PM
Cashiers/Retail	10-Oct	Miami, FL	6:00 PM
Consumers			8:00 PM
Bank Tellers	15-Oct	Chicago, IL	6:00 PM
Cashiers/Retail			8:00 PM
Consumers	16-Oct	Denver, CO	6:00 PM
Law Enforcement			8:00 PM

Table 2. Security feature tallies *Some respondents in this group did not complete this exercise.

			Rank Order					
			Most Useful			*Least Useful*		
Feature	**Top 2**	**Bottom 2**	**1**	**2**	**3**	**4**	**5**	**6**
Total (N = 100)*								
Enlarged Portrait	32	27	18	14	19	15	8	19
Watermark	69	7	39	30	11	6	4	3
Security Thread	47	14	15	32	20	12	4	10
Fine Line Printing Patterns	7	50	1	6	13	23	32	18
Microprinting	7	64	4	3	7	15	34	30
Color-Shifting Ink	25	24	12	13	23	21	11	13
Consumers (N = 19)*								
Enlarged Portrait	7	5	6	1	3	2	1	4
Watermark	13	1	8	5	2	1	1	0
Security Thread	8	3	1	7	3	3	1	2
Fine Line Printing Patterns	1	6	0	1	3	7	5	1
Microprinting	1	12	0	1	2	2	5	7
Color-Shifting Ink	4	7	2	2	4	2	4	3
Cashiers (N = 16)*								
Enlarged Portrait	0	4	0	0	4	3	2	2
Watermark	9	1	6	3	0	1	0	1
Security Thread	10	0	3	7	1	0	0	0
Fine Line Printing Patterns	1	7	0	1	1	2	2	5
Microprinting	1	8	1	0	2	0	6	2
Color-Shifting Ink	1	2	1	0	3	5	1	1
Gambling Dealers/Cashiers (N = 17)								
Enlarged Portrait	5	6	5	0	2	4	2	4
Watermark	14	1	6	8	1	1	0	1
Security Thread	5	2	2	3	8	2	0	2
Fine Line Printing Patterns	2	10	1	1	1	4	6	4
Microprinting	0	12	0	0	2	3	7	5
Color-Shifting Ink	9	3	4	5	3	2	2	1

Table 2. Security feature tallies

			Rank Order					
			Most Useful			Least Useful		
Feature	**Top 2**	**Bottom 2**	**1**	**2**	**3**	**4**	**5**	**6**
Bank Tellers (N = 18)								
Enlarged Portrait	7	6	5	2	4	1	1	5
Watermark	13	2	6	7	3	0	2	0
Security Thread	8	2	4	4	4	4	0	2
Fine Line Printing Patterns	2	8	0	2	3	5	5	3
Microprinting	3	12	2	1	0	3	8	4
Color-Shifting Ink	3	6	1	2	4	5	2	4
Law Enforcement (N = 13)								
Enlarged Portrait	4	3	1	3	3	3	1	2
Watermark	11	0	7	4	2	0	0	0
Security Thread	10	1	4	6	0	2	1	0
Fine Line Printing Patterns	0	8	0	0	3	2	5	3
Microprinting	0	10	0	0	0	3	4	6
Color-Shifting Ink	1	4	1	0	5	3	2	2
Teachers (N = 17)								
Enlarged Portrait	9	3	6	3	3	2	1	2
Watermark	9	2	6	3	3	3	1	1
Security Thread	6	6	1	5	4	1	2	4
Fine Line Printing Patterns	1	11	0	1	2	3	9	2
Microprinting	2	10	1	1	1	4	4	6
Color-Shifting Ink	7	2	3	4	4	4	0	2

Figure 1. Design features for the 1996 series $20 note

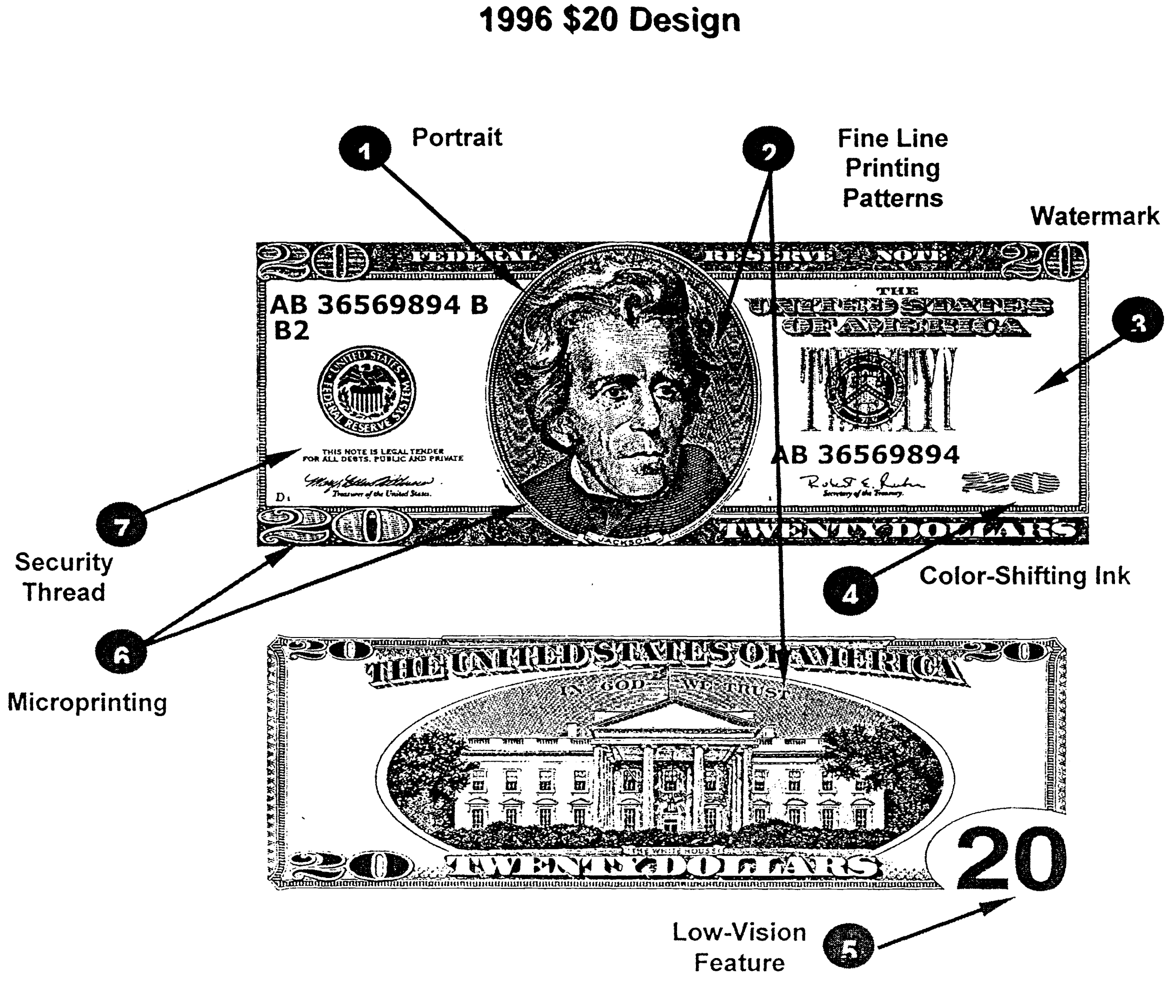


Figure 2. Genuine vs. Counterfeit Watermark

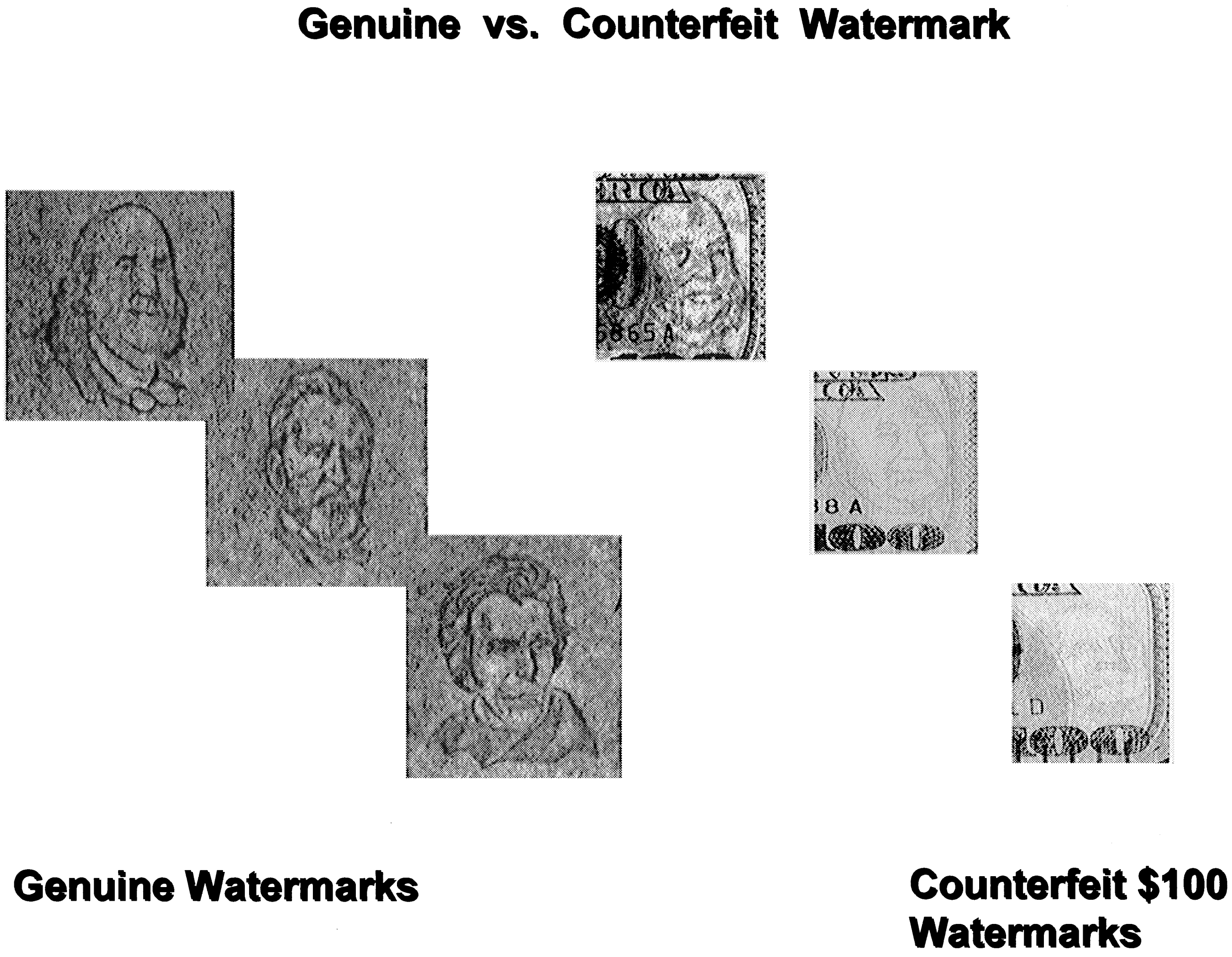
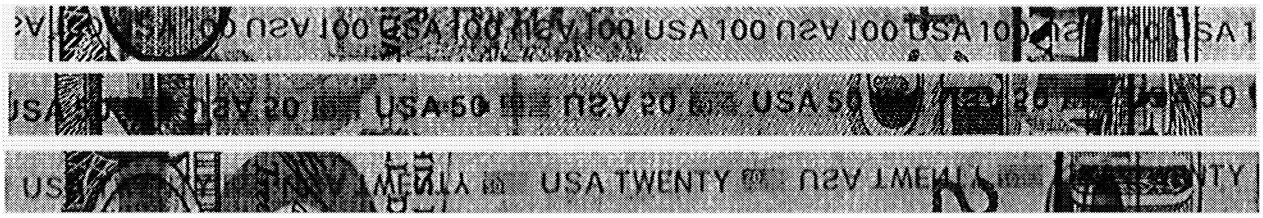
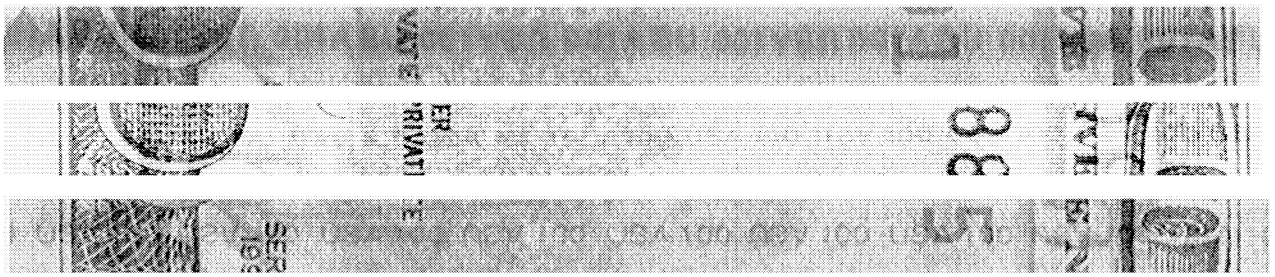

Genuine vs. Counterfeit Watermark
Genuine Watermarks
Counterfeit $100 Watermarks

Figure 3. Genuine vs. Counterfeit Security Thread

Genuine vs. Counterfeit



Genuine Thread



Counterfeit $100 Thread

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